

Do investments in wildfire risk reduction lead to positive financial returns? A return on investment analysis of a payment for ecosystem services program in Colorado

Codie Wilson¹, Kelly W Jones², Jeffery B Cannon⁵, Freddy A Saavedra¹, Stephanie K Kampf³, Brett Wolk⁴, Rob Addington⁶, Antony S Cheng⁵, Benjamin Gannon⁵, Yu Wei⁵, Lee MacDonald³

¹Department of Geosciences, Colorado State University

²Department of Human Dimensions of Natural Resources, Colorado State University

³Department of Ecosystem Science and Sustainability, Colorado State University

⁴Colorado Forest Restoration Institute, Colorado State University

⁵Department of Forest and Rangeland Stewardship, Colorado State University

⁶The Nature Conservancy Colorado Chapter, Boulder, CO

Abstract. A small but growing number of payment for ecosystem services (PES) programs in the western United States focus on wildfire risk reduction. Despite increasing calls for rigorous evaluation, few PES programs assess the impact of their investments on ecosystem service outcomes. In this paper, we used return on investment (ROI) analysis to identify the optimal quantity and placement of wildfire risk reduction interventions to reduce sediment loading to the Strontia Springs Reservoir (SSR) in the Upper South Platte River (USPR) watershed, southwest of Denver, Colorado. Our overarching research question is: what is the quantity and placement of forest fuel treatments that would maximize ROI? To answer this question, we simulated fuel reduction treatments allowing extent of fuel treatment to vary between 5% and 100% of forested land and for the following placement strategies: (a) prioritization and (b) accessibility. We then calculated the expected change in post-fire erosion with and without fuel treatments for X # of scenarios. We found positive ROI when treatments were placed in priority areas with diminishing marginal returns after treating >50-80% of the watershed. While our ROI results should not be used prescriptively they do suggest that, conditional on fire occurrence and precipitation events, investments in the USPR could lead to positive financial returns, in terms of reduced costs of sediment dredging in SSR. The integrated modeling approach presented here can be adopted for other PES programs to inform decisions about investments in wildfire risk reduction activities. Our findings highlight the importance of considering multiple benefits in ROI calculations and emphasize the need for continued investments in monitoring and evaluation of wildfire fuel reduction investments.